CHAPTER 1

LIQUID OXYGEN CONVERTER TEST STAND 59A120

The PRs perform an enormous amount of testing of oxygen components. Although lower rated personnel perform much of this work, the responsibility for maintaining liquid oxygen converter test stands in top running condition is that of the senior PR. Knowing the functions, daily inspections, and adjustments required to maintain such equipment is essential for the lower rated PRs. This information can be found in the *Aircrew Survival Equipmentman 3 & 2*, Vol 2. However, determining the causes of malfunctions, making major adjustments, and replacing parts are the responsibilities of the First Class and Chief Petty Officer.

This chapter covers the 59A120 Liquid Oxygen Converter test stand shown in figure 1-1.

THE 59A120 TEST STAND

The 59A120 is designed to test all liquid oxygen converters and rigid seat survival kits (RSSK) components used-in today's naval aircraft. All instruments, mechanisms, and equipment of the test stand are designed to meet certain criteria. They are designed to meet this criteria even when subjected to the normal pitch and roll of a ship.

The test stand is comprised of a differential pressure gage; three pressure gages; four linear flow elements; a liquid oxygen quantity gage capacitor-type tester; a flowmeter indicator; a bell jar; a heat exchanger; and the necessary integral piping, wiring, hoses, and valves to properly test oxygen components. The performance and technical characteristics of the test stand are shown in table 1-1.

The 59A120 test stand tests liquid oxygen converters, components, and RSSK components for leaks, flow settings, and quantity gaging. This test stand is designed to test liquid oxygen converter components and accessories to make sure they work properly. The test stand is used to perform periodic preventive maintenance, tests, and adjustments.

PREPARATION FOR USE

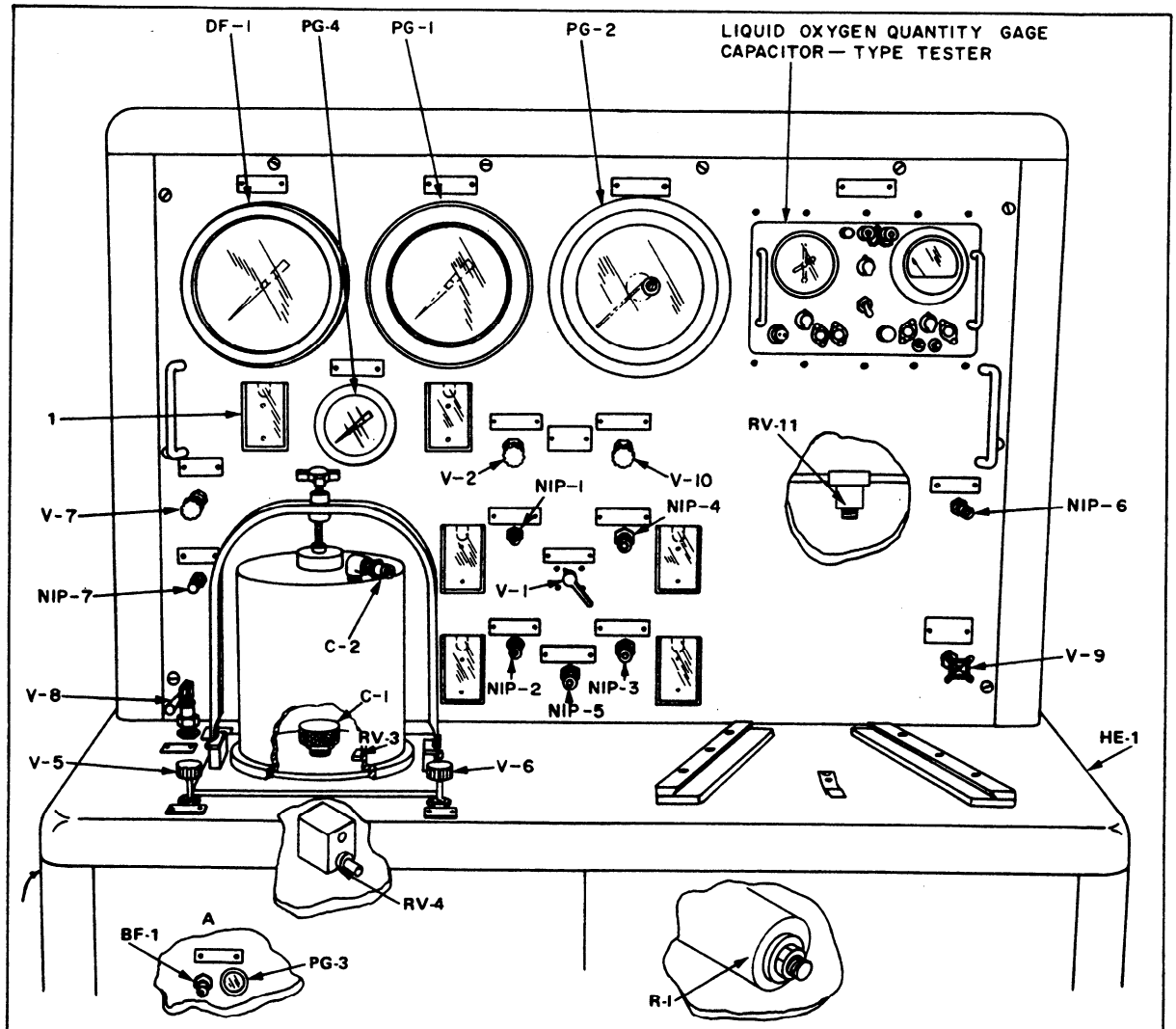
Preparing the test stand for use is divided into five separate tasks to be done by the PR or by the on-site metrology calibration team (CAL TEAM). The five tasks and responsible personnel are as follows:

1. Installation—PR
2. Visual Inspection—PR
3. Correction card preparation-CAL TEAM
4. Leakage testing—PR
5. Calibration—CAL TEAM

Procedures for installation, visual inspections, and leakage testing of the 59A120 are done following NAVAIR 13-1-6.4. Procedures for leakage testing are discussed in this chapter; however, they are not to be used in place of the aforesaid NAVAIR manual.

PERIODIC INSPECTIONS

One of the keys to a trouble-free test stand is the performance of periodic inspections on the test stand. By performing the periodic inspections on time, you find troublesome areas before they become problems.



1 CORRECTION CARD HOLDER
BF-1 SPECIAL BULKHEAD FITTING
C-1 BELL JAR BOTTOM COUPLING
C-2 BELL JAR TOP COUPLING
DF-1 0-100" H_2O DIFFERENTIAL PRESSURE GAGE
HE-1 HEAT EXCHANGER (NOT SHOWN)
NIP-1 0-0.25 LPM FLOWMETER CONNECTION
NIP-2 0-1 LPM FLOWMETER CONNECTION
NIP-3 0-50 LPM FLOWMETER CONNECTION
NIP-4 0-150 LPM FLOWMETER CONNECTION
NIP-5 CONVERTER SUPPLY OUTLET CONNECTION
NIP-6 SUPPLY TO CONVERTER CONNECTION
NIP-7 DIFFERENTIAL PRESSURE GAGE CONNECTION
PG-1 0-160 PSIG TEST PRESSURE GAGE
PG-2 FLOWMETER INDICATOR GAGE
PG-3 0-3000 PSIG SUPPLY PRESSURE GAGE
PG-4 0-15 PSIG LOW PRESSURE TEST GAGE (59A120 ONLY)
R-1 0-160 PSIG OXYGEN PRESSURE REGULATOR
V-1 FLOWMETER SELECTOR VALVE
V-2 TEST PRESSURE GAGE TO BELL JAR VALVE
RV-3 5-15 PSI RELIEF VALVE (SET AT 5 PSI)
RV-4 0-500 PSI RELIEF VALVE (SET AT 180 PSI)
V-5 SYSTEM BLEED VALVE
V-6 OXYGEN SUPPLY VALVE
V-7 DIFFERENTIAL PRESSURE BLEED VALVE
V-8 DIFFERENTIAL PRESSURE SHUT-OFF VALVE
V-9 CONVERTER SUPPLY FLOW CONTROL VALVE
V-10 TEST PRESSURE GAGE BUILD-UP AND FLOW VALVE
RV-11 100-120 PSI RELIEF VALVE (SET AT 110 PSI)

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Figure 1-1.—Liquid Oxygen Converter Test Stand ControI Pad and Counter Top.

Table 1-1.—Leading Particulars

Dimensions:	
Width (inches)	50.12 inches maximum
Depth (inches)	24.06 inches maximum
Height (inches)	68.06 inches maximum
Weight	
	460 pounds maximum (59A120)

Technical Characteristics:	
Indicator	Range
Supply Pressure Gage	0 to 3000 psig oxygen.
Test Pressure Gage	0 to 160 oxygen.
Low Pressure Test Gage	0 to 15 oxygen.
Differential Pressure Gage	0 to 100 inches of H_2O.
Flowmeter Indicator	0 to 10 inches of H_2O.
Leakage Linear Flow Element No. 1	0 to 0.25 LPM
Leakage Linear Flow Element No. 2	0 to 1.0 LPM
Rate Linear Flow Element No. 3	0 to 50 LPM
Rate Linear Flow Element No. 4	0 to 150 LPM
Liquid Oxygen Quantity Gage Capacitor-Type Tester	
Capacitance measuring range	0 to 5000 uuf in four ranges.
accuracy	±0.5% of reading or 0.25% of maximum value of applicable capacitance measuring range, whichever is greater.
Insulation resistance measuring	
range	0 to 10,000 megohms in four ranges.
accuracy	±0.125 inch of scale length.
Maximum voltage at test terminals	Less than 50 volts.
Short circuit current of terminals	Less than 200 milliamperes.

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Table 1-2 lists, by calendar and operating time, the periodic inspections to be performed in the interest of efficient operation.

CLEANING

A clean test stand not only looks neat but it gives better service. A clean stand is essential if leaks are to be located in a timely manner. All external parts of the test stand must be cleaned with oxygen systems cleaning compound Mil-C-81302, Type 1.

When you clean the test stand, be sure the test adapters and connection hoses stored in the accessory tray are also cleaned.

If the front panel of the test stand must be removed for any reason, you must ensure that all gage tester surfaces are free from dust and any other foreign matter. The best way to clean these surfaces is to use clean, low-pressure dry air (about 10 psi is recommended). To clean the interconnecting piping, hoses, and fittings on the test stand, you should use clean, dry air pressure not to exceed 160 psig.

Type 1 Freon is recommended for cleaning the terminals of the Liquid Oxygen Quantity Gage Tester (capacitor type) test stand.

The bell jar on the 59A120 test stand has a sealing O-ring. This O-ring must be cleaned with distilled water and lubricated with alight coat of lubricant Mil G 27617.

Table 1-2.—Periodic Inspection Chart

Inspection	Daily or 8 hr.	Weekly or 50 hr.	Monthly or 250 hr.	Every 6 months
Leak Test.		X	X	
Test Pressure Gage (PG-1) Zero.	X	X	X	
Low Pressure Test Gage (PG-4) Zero. (59A120 only)	X	X	X	
Differential Pressure Gage (DF-1) Zero.	X	X	X	
Pressure Regulator Valve (R-1) Setting.		X	X	
Bell Jar Pressure Relief Valve (RV-3) Setting.			X	
Accessory Section Pressure Relief Valve (RV-4) Setting.			X	
Converter Section Pressure Relief Valve (RV-11) Setting.			X	
Test Pressure Gage (PG-1) Adjustment.			X	
Low Pressure Test Gage (PG-4) Adjustment. (59A120 only)			X	
Differential Pressure Gage (DF-1) Adjustment.			X	
Flowmeter Indicator (PG-2) Zero.	X	X	X	
Linear Flow Element (FLM-1, 2, 3, and 4) Calibration.			X	
Flowmeter Calibration Kit.				X
Pressure Gage Calibration Kit.				X
Liquid Oxygen Quantity Gage (Capacitor-Type) Tester.				X

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WARNING

Never apply oil, grease, or any other material not approved for use in the presence of gaseous and liquid oxygen systems.

CORRECTION CARD PREPARATION AND CALIBRATION

An on-site CAL TEAM must prepare the correction cards and calibrate the 59A120 following NAVAIR 13-1-6.4 procedures. However, because of the operational commitments of today's Navy, you may find yourself with a test stand that needs calibration and correction card corrections when CAL TEAM services are not available. This chapter covers the procedures outlined in the NAVAIR 17-15BC-20 for correction card preparation and calibration.

NOTE: This RTM *does not* authorize you to calibrate the test stand nor does it authorize you to make correction card corrections. These tasks must be authorized by higher authority.

CORRECTION CARDS

Before you operate the 59A120 test stand, individual correction cards for the following components must be prepared: DF-1, PG-1, PG-4, FLM-1, FLM-2, FLM-3, and FLM-4. These correction cards must be prepared prior to calibration of the 59A120 test stand.

To perform calibration and to prepare correction cards, you will need the Flowmeter Calibration Kit and the four graphs that are supplied with the kit for that particular test stand. Each kit will be serialized with the same number as the serial number of the test stand.

To prepare the cards, convert the actual liter-per-minute (lpm) flows to indicated millimeter (mm) flows on cards 4, 5, 6, and 7. Refer to figure 1-2 in the following steps:

1. Using the applicable graph for the flowmeter selected, locate the desired lpm at the bottom of the graph.
2. Trace the selected lpm lineup to where it intersects the graph line.
3. Trace the line from point of intersection to the left-hand edge of the graph to determine mm. Enter this figure in the appropriate column of the correction card.

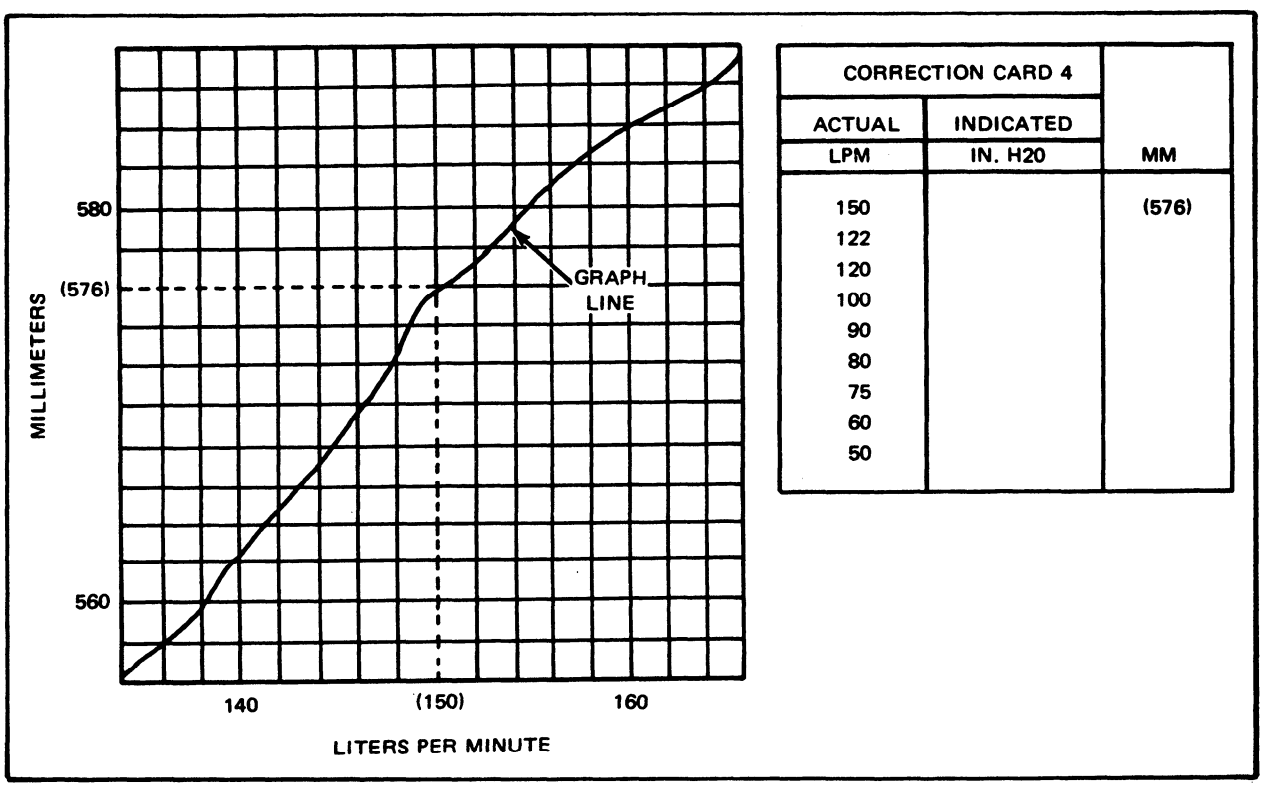


Figure 1-2.—Conversion Example.

4. Using applicable graphs, repeat steps 1 through 3 for all actual flows given on correction cards 4 through 7.

5. Indicated flows (in. H_2O) are entered on the cards when you calibrate the test stand.

Differential Pressure Gage (DF-1)

To prepare the differential pressure gage (DF-1) correction card, refer to figure 1-1 in the following steps:

1. Close system bleed valve V-5 and open the oxygen supply cylinder valve. Connect precision-0-to-100-in. H_2O low-pressure gage 6 (figure 1-3) to bell jar bottom coupling C-1. Open differential pressure shutoff valve V-8.

NOTE: Correction cards will be completed at this time.

2. Slowly open oxygen supply valve V-6 until 100 in. H_2O is indicated on the precision-0-to-100-in. H_2O low-pressure gage. Compare this gage with the reading displayed on differential pressure gage DF-1.

3. Enter the difference (if any) in the indicated in. H_2O column of correction card number 1.

4. Slowly open system bleed valve V-5 to reduce the pressure indication on the precision-0-to-100-in. H_2O low-pressure gage. Reduce pressure in 20-in. H_2O increments. Enter the corrective differential (if any) at each interval on the correction card.

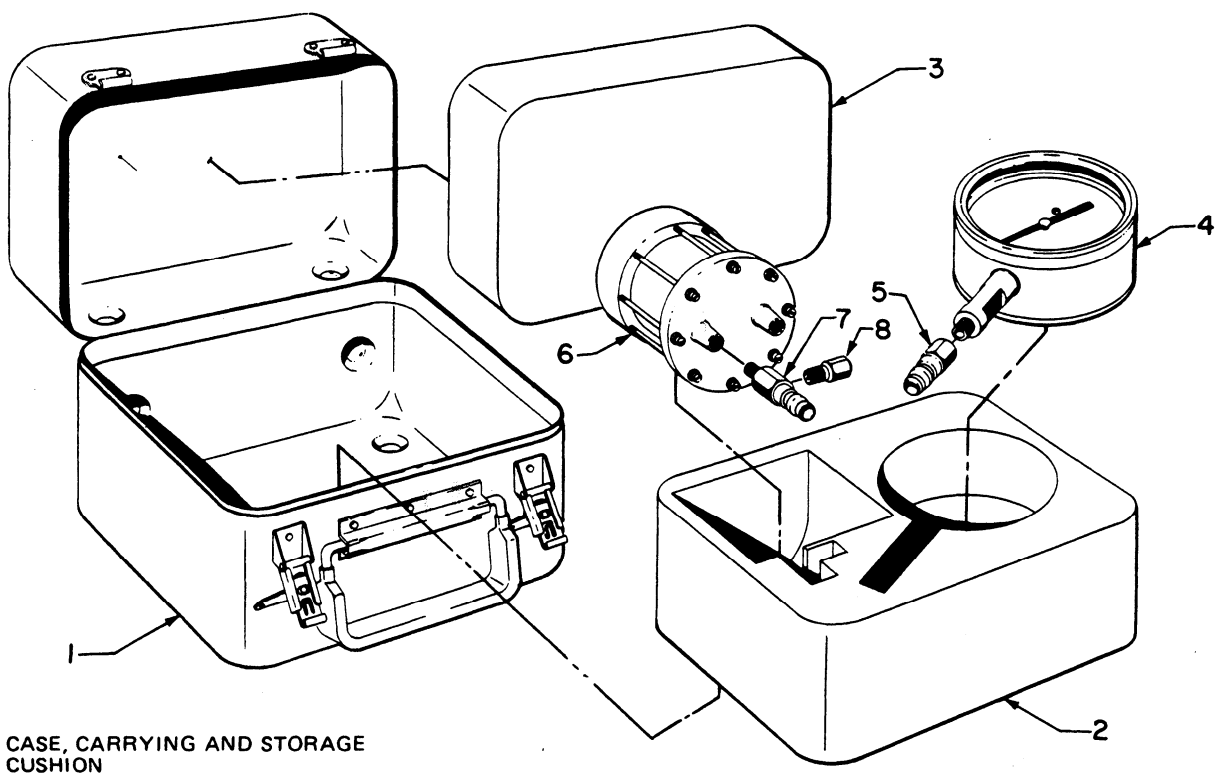
5. When all entries have been made on the correction card, close oxygen supply valve V-6 and differential pressure shutoff valve V-8.

6. Open system bleed valve V-5 and bleed the system. Disconnect the precision-0-to-100-in. H_2O low-pressure gage.

Test Pressure Gage (PG-1)

To prepare the test pressure gage (PG-1) correction card, proceed as follows:

1. Connect precision-0-to-200-psig pressure gage 4 (figure 1-3) to bell jar bottom coupling C-1.



1. CASE, CARRYING AND STORAGE
2. CUSHION
3. CUSHION
4. PRESSURE GAGE, PRECISION 0-200 PSIG
5. NIPPLE
6. LOW PRESSURE GAGE, PRECISION 0-100 IN. H_2O
7. CONNECTOR ASSEMBLY
8. RELIEF VALVE

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Figure 1-3.—Pressure Gage Calibration Kit.

Close system bleed valve V-5, and open test pressure gage to bell jar valve V-2.

2. Open oxygen supply valve V-6 until 160 psig registers on the precision-0-to-200-psig pressure gage; then close valve V-6.

3. Compare the precision-0-to-200-psig pressure gage reading with pressure registered on test pressure gage PG-1. Enter the corrective differential (if any) in the indicated psig column of test stand correction card number 2.

4. Slowly open system bleed valve V-5 to reduce the pressure registered on the precision-0-to-200-psig pressure gage. Enter the corrective differential (if any) at each specified pressure on the test stand correction card.

5. After all correction card entries have been completed, close system bleed valve V-5 and oxygen supply valve V-6.

Low-Pressure Test Gage (PG-4)

To prepare a low-pressure test gage (PG-4) correction card, proceed as follows:

1. With precision-0-to-200-psig test gage 4 (figure 1-3) still attached to bell jar bottom coupling C-1, open oxygen supply valve V-6 until 7.5 psig is indicated on the precision-0-to-200-psig test gage. The pointer of low-pressure test gage PG-4 should be at midscale. If the pointer is not at midscale, adjust by turning the adjustment screw on the back of the gage.

2. Slowly open oxygen supply valve V-6 until 14 psig registers on the precision-0-to-200-psig test gage; then close oxygen supply valve V-6. Compare the reading with the indication on low-pressure test gage PG-4. Enter the corrective differential (if any) in the indicated psig column of test stand correction card number 3.

3. Slowly open system bleed valve V-5 and reduce the pressure indicated on the precision-0-to-200-psig pressure test gage in 2-psig increments. At each increment, enter the corrective differential (if any) on the test stand correction card.

4. After all correction card entries have been completed, ensure oxygen supply valve V-6 is closed; then open system bleed valve V-5 and close test-pressure-gage-to-bell-jar valve V-2. Remove the precision-0-to-200-psig test gage from bell jar base coupling C-1.

Linear Flow Elements (FLM-4), (FLM-3), (FLM-2), and (FLM-1)

To prepare the linear flow element correction cards, place the Flowmeter Calibration Kit (shown in figure 1-4) on the test stand counter top; then

1. CASE, CARRYING AND STORAGE
2. ADAPTER, TUBE, UPPER
3. ADAPTER, TUBE, LOWER
4. NIPPLE
5. NIPPLE
6. FLOWMETER, 0-125MM (0.0-25 LPM)
7. FLOWMETER, 125-250MM (0-1.0 LPM)
8. FLOWMETER, 250-500MM (0-50 LPM)
9. FLOWMETER, 500-750MM (0-150 LPM)

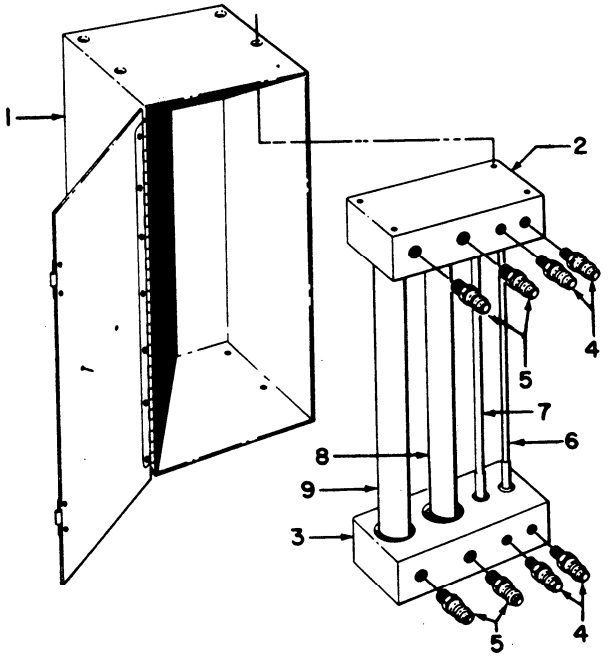

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Figure 1-4.—Flowmeter Calibration Kit.

beginning with the 0-to-150-lpm flow element (FLM-4), proceed as follows:

1. Using hose assembly 3 (figure 1-5), connect the top connection of the 500-to-750-mm calibration kit flowmeter 9 (figure 4-4) to test stand flow element connection NIP-4. Using hose assembly 6 (figure 1-5), connect the bottom connection of the calibration kit flowmeter to bell jar base coupling C-1.

2. Set flowmeter selector valve V-1 to the 0-to-150-lpm position. Ensure system bleed valve V-5 is closed.

NOTE: Flows used shall be taken from the mm column of the calibration correction cards. This previously completed column contains flows in millimeters (mm) equivalent to corresponding lpm flows.

3. Using oxygen supply valve V-6, set the flow equivalent to 150 lpm (from correction card number 4) on the 500-to-750-mm calibration kit flow element. The flow, in inches H_2O, will be displayed on flowmeter indicator PG-2. Enter this reading in the indicated in. H_2O column of correction card number 4 opposite the actual mm flow being drawn.

4. Reduce the flow to the next millimeter reading by adjusting oxygen supply valve V-6. Repeat step 3. Continue in this manner until all flows on correction card number 4 have been completed.

5. Close oxygen supply valve V-6 and disconnect the hose and the calibration kit flowmeter from the test stand.

NOTE: Hose assembly 3 (figure 1-5) and hose assembly 6 are used in calibrating all linear flow elements.

6. Connect the top connection of the 250-to-500-mm calibration kit flowmeter to test stand flow element connection NIP-3; connect the bottom connection to bell jar base coupling C-1. Rotate flowmeter selector valve V-1 to the 0-to-50-lpm position. Ensure system bleed valve V-5 is closed.

7. Repeat procedures outlined in steps 3 through 5, using flows given on correction card number 5.

8. Connect the top connection of the 125-to-250-mm calibration kit flowmeter to test stand flow element connection NIP-2; connect the bottom connection to bell jar coupling C-1. Rotate flowmeter selector valve V-1 to the 0-to-1.0-lpm position. Ensure system bleed valve V-5 is closed.

9. Repeat procedures outlined in steps 3 through 5, using flows given on correction card number 6.

10. Connect the top connection of the 0-to-125-mm calibration kit flowmeter to test stand flow element connection NIP-1; connect the bottom connection to bell jar base coupling C-1. Rotate flowmeter selector valve V-1 to the 0.0-to-0.25-lpm position. Ensure system bleed valve V-5 is closed.

11. Repeat procedures outlined in steps 3 through 5, using flows given on correction card number 7.

12. Disconnect hoses 3 and 6 (figure 1-5) from the calibration kit and test stand. Close oxygen supply cylinder valve V-6 and open system bleed valve V-5 to bleed the test stand. Secure all test stand valves.

TROUBLESHOOTING

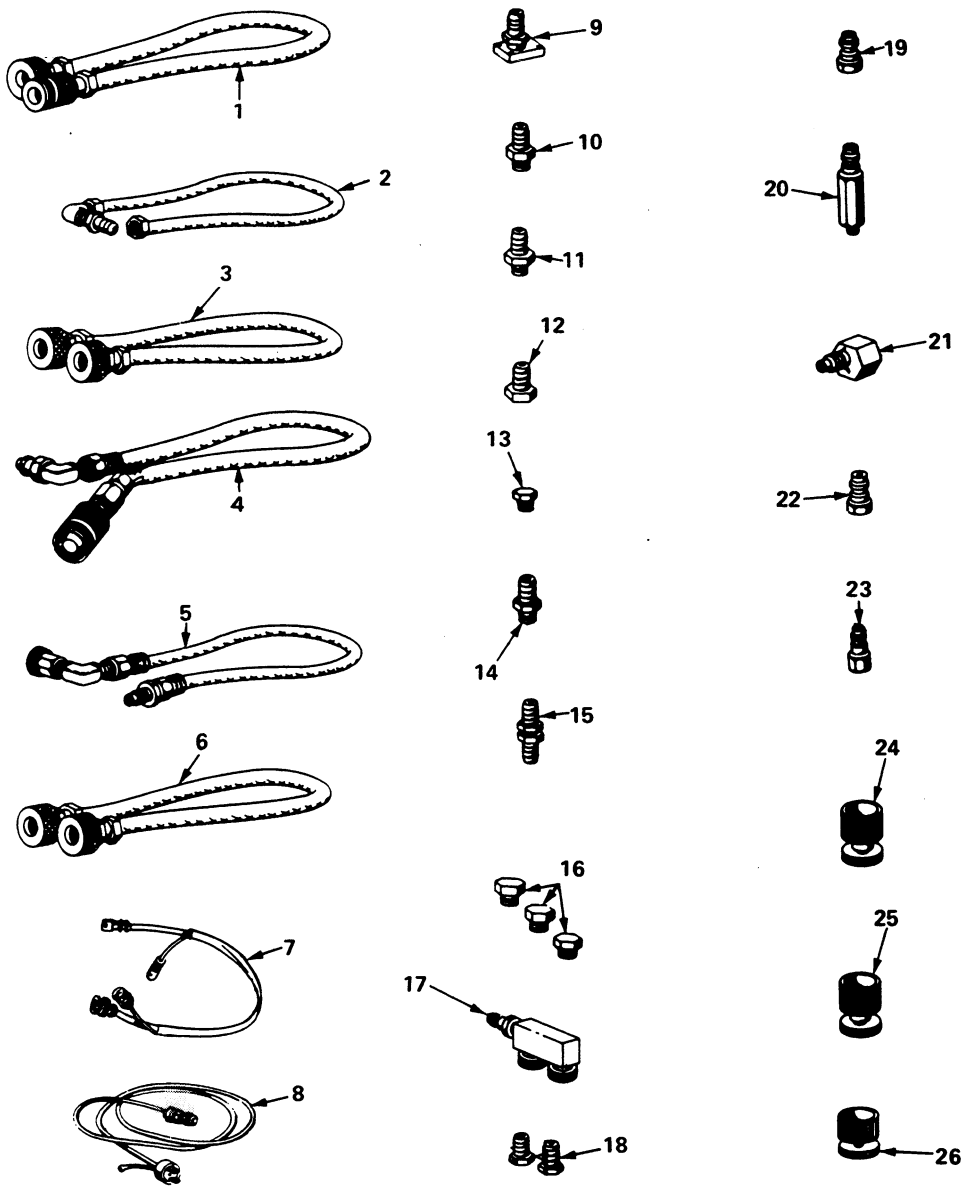
A properly working test stand will give you outstanding results while testing oxygen converters. As with any test stand, a small leak in your plumbing system will give you inaccurate readings and may cause you to think you have a defective converter or component. Some parts on the 59A120 test stand must be corrected when they become defective by the on-site meteorology calibration team. You might have a gage that has a pointer which isn't zeroed, or you might have a flow element that consistently reads low. You could also have a gage that provides correct readings over only part of the scale. In such cases, you will need the calibration team's assistance to repair the component.

Upon completion of any maintenance action, you will be required to fill out a Ground Support Equipment Subcustody and Periodic Maintenance Record (OPNAV 4790/50) and a Ground Support Equipment Custody and Maintenance Record (OPNAV 4790/51).

The following problems may occur within your test stand; you, as a senior PR, will be required to fix them. Refer to NAVAIR 17-15BC-20 for parts removal and replacement.

PG-1 Reads Low

The 0-160 psig pressure gage is used to indicate pressure applied to an item under test. Anytime



1. HOSE ASSEMBLY
2. HOSE ASSEMBLY
3. HOSE ASSEMBLY
4. HOSE ASSEMBLY
5. HOSE ASSEMBLY
6. HOSE ASSEMBLY
7. CABLE ASSEMBLY
8. CABLE ASSEMBLY
9. PLATE, ADAPTER
10. CONNECTOR ASSEMBLY
11. CONNECTOR ASSEMBLY
12. CONNECTOR ASSEMBLY
13. PLUG ASSEMBLY
14. CONNECTOR ASSEMBLY
15. NIPPLE ASSEMBLY
16. PLUG ASSEMBLY
17. ADAPTER ASSEMBLY
18. CONNECTOR ASSEMBLY
19. CONNECTOR ASSEMBLY
20. CONNECTOR ASSEMBLY
21. CONNECTOR ASSEMBLY
22. CONNECTOR ASSEMBLY
23. CONNECTOR ASSEMBLY
24. ADAPTER VALVE
25. ADAPTER VALVE
26. ADAPTER VALVE

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Figure 1-5.—Test Stand Accessories.

this gage consistently reads low, you probably have leaky fittings. To correct this problem, you will need to perform one or two leakage tests.

To perform leakage tests, pressurize the system and apply a soap solution to the various fittings. Escaping gas will form soap bubbles, and you can locate the leaks.

Leakage Test, Accessories Section

To perform the leakage test on the accessories section of the test stand, proceed as follows:

1. Install nipple assembly 14 (figure 1-5) in bell jar bottom coupling C-1. Connect one end of hose 3 (figure 1-5) to the adapter and the other end to differential pressure connection NIP-7.
2. Ensure test-pressure-gage-to-bell-jar valve V-2 is open. Ensure system bleed valve V-5, test pressure gage build-up and vent valve V-10, and differential pressure bleed valve V-7 are closed.
3. Open differential pressure shutoff valve V-8.
4. Open oxygen supply cylinder valve. Open oxygen supply valve V-6 until 160 psig is indicated on test pressure gage PG-1.
5. Close oxygen supply valve V-6. Leakage will be indicated by a drop in pressure on PG-1. Leakage must not be more than 2 psig in 10 minutes.
6. Leave all hoses and valves in their present position.

Leakage Test, Test Stand

To perform the leakage test on the entire test stand, proceed as follows:

1. Open converter supply flow control valve V-9 and test pressure gage build-up and flow valve V-10.
2. Plug converter supply outlet NIP-5 and supply to converter connection NIP-6. Ensure system bleed valve V-5 is closed.
3. Open supply valve V-6 until relief valve V-11 unseats. (Relief valve shall relieve at no more than 120 psig and be leak-tight at 100 psig.) Using system bleed valve V-5, decrease pressure until 100 psig is indicated on test pressure gage PG-1. Close valve V-6. Leakage will be indicated by a drop in pressure on PG-1. Leakage shall be no more than 10 psig in 10 minutes.
4. Bleed the test stand by opening system bleed valve V-5. Close all test stand valves. Remove plugs from converter supply outlet NIP-5 and supply to converter connection NIP-6.

PG-1 Pointer Pegs

Anytime the 0-160 psig pressure gage pegs, it is caused by pressure regulator R-1. This pressure regulator is set to maintain 160 psig with 1800 psig supply pressure applied. If the PG-1 pressure gage pegs, your regulator is delivering pressure above 160 psig and the pressure must be adjusted.

To set oxygen pressure regulator R-1 to maintain 160 psig with 1800 psig supply pressure applied, proceed as follows:

CAUTION

Valves V-2, V-5, V-6, V-7, and V-10 are metering (needle) valves. Overtightening when closing will damage valve seat. Only finger-tight pressure should be used when closing valves.

1. Ensure all test stand valves are closed, and plug bell jar bottom coupling C-1.

WARNING

When you are working with oxygen, make certain that clothing, tubing, fittings, and equipment are free of oil, grease, fuel, hydraulic fluid, or any combustible materials. When oxygen is under pressure, fire or explosion may result when even slight traces of combustible materials come in contact.

2. Open oxygen supply cylinder valve.

NOTE: When setting regulator R-1, a minimum of 1800 psig oxygen pressure should be applied to the regulator.

3. Slowly open test-pressure-gage-to-bell-jar valve V-2, and fully open oxygen supply valve V-6.
4. Loosen the hex locknut located on the front of regulator R-1. Turn the T-handle until 160 psig registers on test pressure gage PG-1. Tighten the hex locknut.
5. Close the oxygen supply cylinder valve and open system bleed valve V-5 to bleed pressure from system. Remove the plug from bell jar bottom coupling C-1.

PG-4 Indicates Low Readings Consistently

The 0-15 psig pressure gage PG-4 measures extremely low pressures from the item under test. This gage is protected from high pressures by gage guard GP-1, which is set between 11 and 14 psig. To locate any leaks in this system, you will need to perform the leakage test described earlier for the test stand. You will not be required to perform the leakage test for the accessories section. In most cases by tightening the necessary fittings, you will be able to remedy the low readings on the PG-1 pressure gage.

Differential Pressure Gage (DF-1) Indicates Low

The 0-100-in. H_2O differential pressure gage is a bellows-operated gage used to indicate differential pressure when the pressure closing and pressure opening valves are tested. The probable cause for low readings on this gage is a leaky shut off differential pressure valve V-8. If you are lucky, you can correct it by tightening the fittings. If this does not solve the problem, you will need to replace the valve.

Bell Jar Leakage

You may also have problems with the bell jar. The bell jar is used for testing components having more than one possible area of leakage. The bell jar consists of the bell jar itself, a relief valve with a range of 5 to 15 psig, and a bell jar coupling. The relief valve is designed to be leakproof at 5 psi and set to relieve at 10 psig.

To perform the leakage test on the bell jar assembly, proceed as follows:

1. Remove hose assembly 3 and nipple assembly 14 (figure 1-5) from the bottom bell jar coupling C-1. Disconnect the opposite end of the hose from differential pressure connection NIP-7.
2. Ensure differential pressure bleed valve V-7, test-pressure-gage-to-bell-jar valve V-2, and system bleed valve V-5 are closed. Open differential pressure shutoff valve V-8.
3. Place the bell jar on the fixture and secure it with a clamp. Plug bell jar top coupling C-2.
4. Slowly open oxygen supply valve V-6 until 100 in. H_2O is indicated on differential pressure gage DF-1. Close valve V-6. Leakage, indicated by a drop in pressure on DF-1, shall not be more than 2 in. H_2O in 10 minutes.
5. Close the oxygen supply cylinder valve and open system bleed valve V-5 to bleed the system.

CAUTION

When the test stand is secured, all valves with the exception of system bleed valve V-5 will be closed. Valve V-5 is left open to prevent accidental build-up of pressure in the system.

6. Secure all test stand valves. Leave system bleed valve V-5 open.

REPAIRING AND REPLACING PARTS

Anytime you have a defective or damaged part, it must be repaired or replaced. Information on part numbers can be found in the NAVAIR 17-15BC-20 manual.

You may on occasion find you have a defective piece of tubing. To replace any tubing installed on this test stand (59A120), remember that you are dealing with high-pressure oxygen. Therefore, you must use tubing with a minimum wall thickness of 0.049 to replace any defective tubing. This tubing may be cut to length and flared to replace any defective portion of tubing.

WARNING

When you work with oxygen systems, never use any parts that have been in contact with oil, grease, or any other material that is not approved for use in the presence of high-pressure oxygen. Fire or explosion may result when even the slightest trace of combustible material comes in contact with pressurized oxygen.

Heat Exchanger Panel

If the heat exchanger panel is defective, it may be replaced. You may replace the panel by disconnecting its connections and removing it's seven retaining screws. If a new heat exchanger is used, you may drill or punch holes not exceeding 11/32 inch in diameter in the perimeter, beyond the outer seam welds, for use in mounting. When the holes are drilled at installation, you should be careful to prevent the drill from puncturing the seam welds.

Lubrication

The test stand nor its components require lubrication.